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UNITED STATES GOVERNMENT

M E M O R A N D U M

DATE: November 15, 1993

REPLY TO

ATTN OF: Robert Cleveland, SED, OET *rfc*

SUBJECT: Items to be placed in Docket ET 93-62

TO: Secretary, FCC

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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

Please place the attached two items in the record for ET Docket 93-62, "Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation." Five copies of each of these items is enclosed.

**ITEM 1:** Letter from IEEE, signed by E. Adair, and dated October 11, 1993.

**ITEM 2:** Letter from Loral Microwave-Narda, signed by R. Strickland, and dated November 11, 1993.

ENCLOSURES

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**LORAL**

Microwave-Narda

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435 Moreland Road  
Hauppauge, NY 11788  
516-231-1700  
Fax: 516-231-1711

SPECTRUM

November 11, 1993

Federal Communications Commission  
Office of Engineering and Technology  
Mail Stop 1300A2  
1919 Street, N.W.  
Washington, D.C. 20554

Attention: Dr. Robert F. Cleveland Jr., Ph.D.

Subject: Ex-Parte Comments Relating to Notice of  
Proposed Rule Making ET Docket No. 93-62

Dear Dr. Cleveland:

The Narda Microwave Corporation is the leading designer and manufacturer of instrumentation used to measure and/or detect radiofrequency radiation. To date Narda has been granted thirty-six patents in this area and several more are pending. Our comments relate to measurement practice and available instrumentation and protective devices.

**Contact Currents:**

Narda has recently developed a contact current meter (model 8870) as well as an induced current meter (Model 8850). It is our experience that although a reasonable relationship exists between electric field and magnetic field levels and induced current levels, *no such predictable relationship exists between E and H field levels and contact current levels.* Narda recently conducted extensive measurements of induced and contact currents as a demonstration to the U.S. Navy on their ground plane at the Naval Surface Weapons Center in Dahlgren, Virginia. Measurements were made with a F/A-18 aircraft and a simulated shipboard deck structure illuminated with RF energy over a frequency range of 10 to 25 MHz. Contact currents varied by greater than 8 dB for a constant field strength at the re-radiating structure. Much of the variation is related to the position of the subject relative to the position of the primary and secondary radiators. James Hatfield of Hatfield and Dawson Consulting Engineers has made numerous contact current measurements using some prototype equipment. He cites one instance where the electric field level was only 7 V/m, yet the contact currents far exceeded the 100 ma MPE of IEEE C95.1-1991.

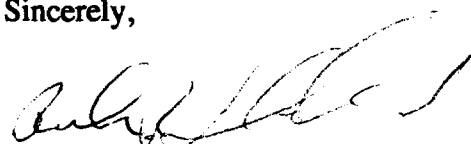
# LORAL

Microwave-Narda

## **Personal Protection:**

The Environmental Protection Agency's report, *Near-Field Radiation Properties of Simple Linear Antennas with Applications to Radiofrequency Hazards and Broadcasting* number ORP/EAD 78-4, shows that the magnetic energy present in the near-field of these typical broadcast radiators is much higher - as much as 60 dB higher - than the energy content of the electric field. IEEE C95.1-1991 and its predecessor ANSI C95.1-1982 restrict human exposure to both the magnetic field and the electric field components of radiofrequency radiation. It is for this reason that Narda's personal monitors, Models 8842C-0.5 (50 to 1000 MHz) and 8845C-0.5 (50 to 2500 MHz), are designed to detect the magnetic field. Conversely, some of the protective clothing being touted blocks only the electric field component and has little affect on the magnetic field. Both field components are potentially dangerous. But since the magnetic field dominates in many broadcast environments, it is Narda's opinion that this type of protective clothing provides little protection and leads to a false sense of security that endangers human health.

Sincerely,



Richard R. Strickland  
Director, Business Development

RRS:cgs



**IEEE**

**STANDARDS COORDINATING COMMITTEE 28  
NON-IONIZING RADIATION**

October 11, 1993

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University of California,  
at Berkeley  
(415) 486-5435

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University of Washington  
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Dr. John M. Osepchuk  
Raytheon Company  
(617) 860-3041

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Dr. Howard Bassen  
Ctr. Devices & Radiological Health,  
FDA  
(301) 443-3840

**SC-2**

Terminology and Units  
of Measurements  
Mr. Richard A. Tell  
Richard Tell Assoc., Inc.  
(702) 645-3338

**SC-3**

Safety Levels with Respect to  
Human Exposure, 0-3 kHz  
Dr. John A. Bergeron  
G. E. Corp. R & D  
(518) 387-6350

**Mr. William Faero**

Electric Research and Management, Inc.  
(814) 466-3031

**SC-4**

Safety Levels with Respect to  
Human Exposure, 3kHz-300GHz  
Dr. Eleanor R. Adair  
J.B. Pierce Foundation Labs  
(203) 562-9901 Ext. 218

**Dr. Om P. Gandhi**

University of Utah  
(801) 581-7743

**SC-5**

Safety Levels with Respect to  
Electro-Explosive Devices

Mr. Thomas P. Stanley

Chief Engineer

Federal Communications Commission

Washington, D.C. 20554

Dear Mr. Stanley:

Your letter of June 2, 1993 to Mr. Andrew G. Salem of the IEEE Standards Board, requesting an interpretation of Section 4.2 of IEEE C95.1-1991, has been referred to IEEE Standards Coordinating Committee 28, Subcommittee 4, for response. This Subcommittee, which drafted the recently-promulgated C95.1 protection guidelines, has established a representative working group whose charge is to respond to requests for interpretation of these guidelines.

In your letter to Mr. Salem, you state the following:

"In Section 4.2 formulas are given for determining exclusions for the Maximum Permissible Exposure limits for: (1) 'controlled' environments and (2) 'uncontrolled' environments based on radiated power of a low-power device. For controlled environments the formula is  $7(450/f)$  W or less for frequencies between 450 and 1500 MHz. For uncontrolled environments the formula is  $1.4(450/f)$  W for frequencies between 450 and 1500 MHz.

We would like to use these expressions up to a frequency of 2200 MHz for determining potential exclusions based on radiated power. However, since the upper limit given in the standard is 1500 MHz, we would like to know if such an extension to this higher limit is technically supportable."

In response to your specific question, an extension of the formula for low-power exclusion to 2200 MHz from 1500 MHz, is, in our opinion, also an extension/revision of the existing standard. As an "interpretations" working group, we cannot predict what kind of extension may be drafted into the next revision of C95.1. However, we can comment on the likelihood that your proposed extension will or will not be conservative with respect to future standard extensions. We believe it is.

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OFF.  
ENGINEER  
AND TECHN.

Mr. Thomas P. Stanley

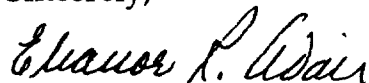
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The formulas in Section 4.2 of IEEE C95.1-1991 suggest a continued dropping of power with increased frequency. There is considerable belief, however, that a "deminimus" power,  $P_{\min}$ , exists which, when absorbed in a small volume of normal tissue, will not lead to thermal damage or violate the specific SAR rules properly interpreted for partial-body exposure.

We believe that  $P_{\min}$  is high enough to deter future extension of the subject formulas to 10 GHz and above. Therefore, between 1.5 and 10 GHz, at worst, the formulas might be extended part way but then would shift into a modified trend upward from straight extrapolation. Therefore, your choice, as FCC policy, to extend the formulas would be conservative.

Prof. Om P. Gandhi of the University of Utah, Co-Chairman of SC-4, shares this view and will write you separately, enclosing some recent relevant data he has collected in his laboratory.

Sincerely,



Eleanor R. Adair  
Co-Chairman, SC-4

cc: O. P. Gandhi  
T. F. Budinger  
A. W. Guy  
J. M. Osepchuk  
R. C. Petersen  
A. G. Salem